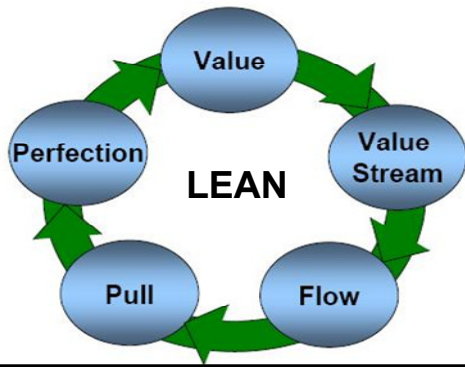


Process Improvement Flow Guide



Lean production is a business system for organizing and managing product development, operation, suppliers, and customer relations that require less human effort, less space, less capital, less material, and less time to make products with fewer defects to precise customer desires. (Lean.Org)

- Strategic Alignment & VOC
- SIPOC\High Level Map
- Constraint / Gap Analysis
- Value Stream Mapping
- Value Added (NVA)
- Walk the Process
- Spaghetti Diagram
- Ideal State / BPR
- Future State

- Point of Use
- 5S's
- Visual Management
- Standard Work
- Error-proofing
- Quick Change Over
- Total Production Mtc/Admin.
- Leveling / Mixed Model
- Cells / One Piece Flow
- Kanban / Pull

- TOC / Critical Chain
- 5 Why's / Cause & Effect
- Pareto /Control Charts
- Brainstorming

- Action Plan
- Implementation
- Feedback Loop

8 WASTES

Defects

Overproduction

Waiting

Non-Standard over-processing

Transportation

Intellect

Motion

Excess Inventories

CELL: A type of lateral organization or process complete operation, where work is organized by outcomes.(Hyier & Brown)

Cycle Time: Avg. time to complete a process from release.

FIFO: (First in / First Out)

Kaizen: Change for good.

Lead-Time: Time to deliver a product from order.

Process: Organized group of related activities that together create a result of value to customers.

Standard Work: The documentation, communication, and storage of best practices for a particular process by employees performing the work.

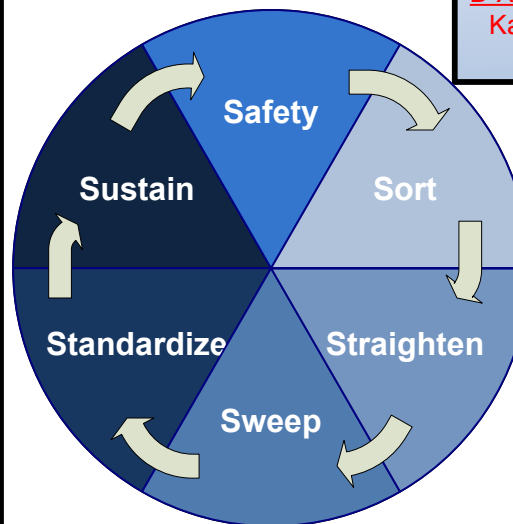
WIP: (Work in Process)

TOC: Theory of Constraints

Critical Path: Time constraint, apply TOC.

Critical Chain: Resource constraint, apply TOC.

Air Force 6S



TAKT Time

Available time divided by customer demand provides process capability compared to cycle time.

$$\text{TAKT Time} = \text{OT (Net Operating Time)} / \text{CR (Cust. Requirements)}$$

Example

One 8 hour shift = 60 Min/hr * 8 hrs = 480 min/shift

Breaks = 30 min shift

Start up meeting = 10 min/shift

Lunch = 30 min/shift

End of Shift Clean = 10 min/shift

Machine Setup = 15 min/shift

Net operation time = 480-30-10-30-10-15= 385 min/shift

Customer Demand: 50 units/shift

TAKT Time = 385/50 = a unit every 7.7 minutes

Little's Law

Little's Law provides an equation for relating Lead Time, Work-in-Process (WIP) and Average Completion Rate

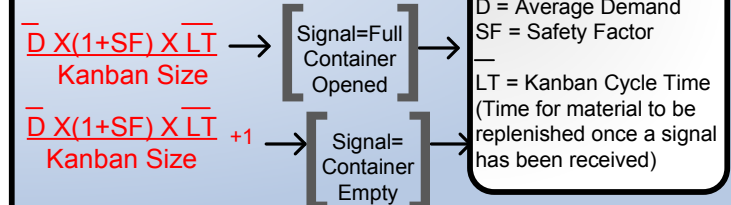
$$\text{Lead Time} = \text{WIP (units)} / \text{"Ship" (units per time period)}$$

Example

A quoting department can complete 4 quotes per day (Ship), & there are 20 quotes (WIP) in various stages in the dept. Applying Little's Law:

Lead Time = WIP/Ship = 20 quotes/4 quotes/day = 5 days

KanBan Cycle Time



Minimum Manning

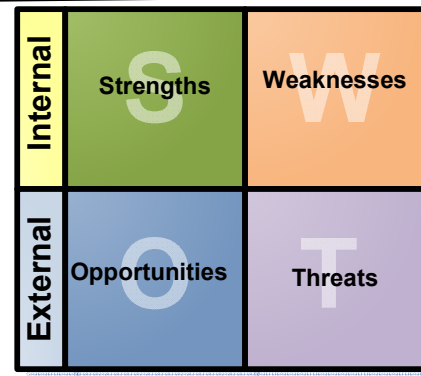
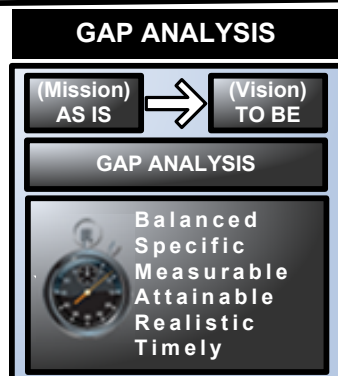
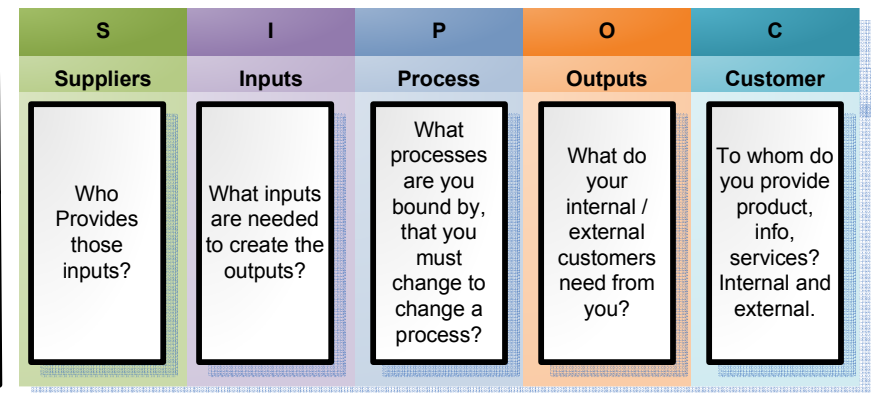
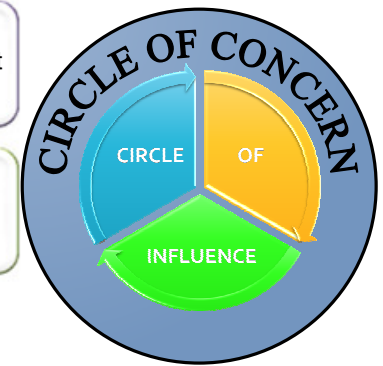
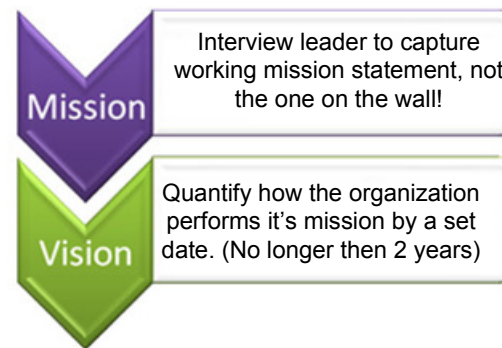
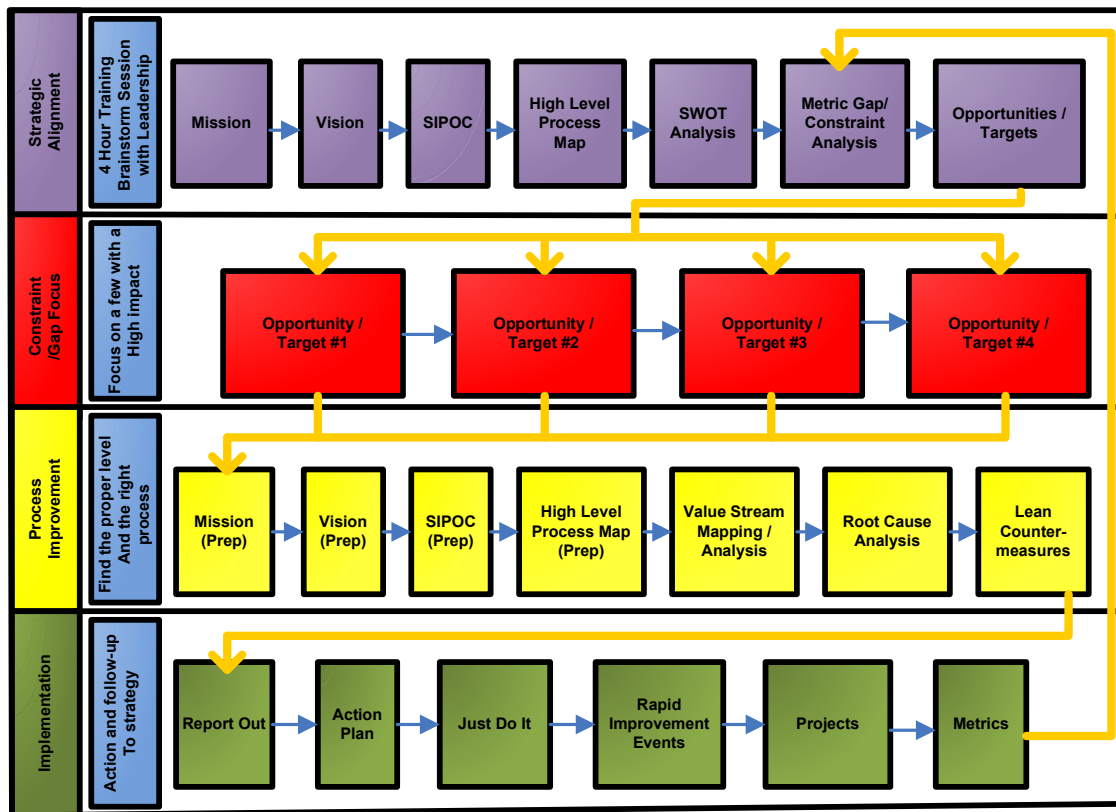
Estimate # of Workers Needed

$$\text{Sum of Cycle times} / \text{TAKT Time}$$

Facilitator Notes

- Handoffs
- Percent complete and accurate
- Ask WHY 5 times
- Walk the process
- Brainstorm ideas
- What do you think?
- Ask about waste in non-threatening way
- "Multitasking is worse then a lie"





Value-Added Activities

The inherent worth of a product as judged by the customer and reflected in it's selling price and market demand. Lean Lexicon, LEI

Non-Value Added and Waste

- That which does not contribute to what the customer is willing to pay but is required under the current process.
- Does not fit, form, or function.
- Done for internal use.
- Would not pass a line-item veto (by customer – internal or external)

Hi-Level Process Map

